WQB "Wide Aperture Quad" for Main Injector

17 February 2005
IB2 conference room
9:00 AM

Attendees: Linda Alsip, Bruce Brown, John Carson, Weiren Chou, Hank Glass, Dave Harding, Vladimir Kashikhin, Lucy Nobrega, John Zweibohmer

Beam tubes

It was reported that, after discussion among the AD parties, it was agreed that a single beam tube configuration would be satisfactory. There does not seem to be sufficient advantage to a second configuration to merit the extra effort. TD will make the star to round transition on the magnet. TD will attempt to make a smooth transition by swaging the star tube to round. If that proves exceptionally difficult, the distance of the circulating beam from the tube walls will allow a sharp transition. AD will make the transition, smooth or otherwise, to the adjacent beam tube with a spool piece.

Bob Weber has taken a first look at the BPM. The old large aperture BPM's have an ID of 4.625". We have asked the beam tube vendor for the diameter of the tube that they are making to form into the star shape. That is the size we would get by tapering back to a round shape.

TD needs from AD a specification of the flange diameter at each end of the magnet, the flange-to-flange length of the tube, and the longitudinal location of the beam tube relative to the magnet (either center to center or one end to one end).

The vendor is now making the round tubes. They expect to have the forming tooling in mid-March. Gregg Kobliska will visit them then to assure us that all is well.

Magnet measurements

Hank reported on magnetic measurements of one end of an IQC magnet. The measurement consisted of measuring the gradient integrated from minus infinity to various depths into the magnet as a function of current. Fitting the integrated fields at a single current to a straight line, the slope gives the body gradient and the intercept with the z axis gives the effective length of the end of the magnet. The effective length of the end of that magnet (IQC040) is about -8 mm and essentially independent of excitation. The body field shows saturation, as expected from the total magnet integral.

This measure of the effective length of the end could be compared with the number calculated from the difference between the effective lengths of the IQC and IQD magnets and their steel lengths. The relative integrated strengths of the IQC and IQD magnets and the relative steel length would give an independent measure of the effective length of the ends. The same could be done with IQB and IQA magnets, being careful to only look at "new style" magnets.

Design

The Web page and other documentation need to make clear the basis and parameters for the various field calculations. Vladimir and Dave will work on this. The goal is to match the performance of the actual magnets. AD needs to decide where in the excitation curve to set the uncorrected match – low field or high field. Matching at high field might make sense to maximize the adjustment range, which is 2% at high field and proportionally more at lower fields. AD/EES

may have an opinion on which way it is easier to run the power supplies. Weiren will ask Dan Wolff or Leon Bartelson.

Schedule

Main coil winding had been scheduled to start last week. As part of the expected learning curve the support for the reel of conductor is being revised. This should not have any impact on the completion date.

Next meeting in two weeks: Thursday, 3 March 2005. Same time, same place.